

ABSTRACT

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A method for making a zeolite includes impregnating a porous inorganic oxide with a liquid solution containing an inorganic micropore-forming directing agent. The amount of liquid solution is no more than about 100% of the pore volume of the porous inorganic oxide, and the concentration of the directing agent in the liquid solution ranges from about 21% to about 60% by weight. The impregnated amorphous inorganic oxide is heated at a synthesis temperature of from about 50°C to about 150°C for a duration of time sufficient to form a zeolite-containing product. The method herein is advantageous for the transformation of a mesoporous or macroporous amorphous inorganic material to a composite structure containing the original mesopores or macropores, but wherein at least some of the porous inorganic oxide material is converted to nanocrystalline zeolite, such as zeolite Y. Also, a unique composition of matter is defined having the X-ray diffraction pattern of zeolite Y, a silica to alumina molar ratio of less than 10, preferably less than 6, and a crystal size of no more than about 100 nm.